

BIOESTHETIC POSTS- AREASON TO SMILE: A REVIEW

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Abstract: Preservation of natural tooth is the ultimate objective of dental treatment. After endodontic treatment, tooth becomes brittle and prone to fracture . In order to strengthen crown some anchorage within teeth is necessary which is gained by rigid structure known as post. Despite having varied types of commercially available posts, none of them meet all the ideal biological and mechanical properties. In this context a Biological Post serves as a homologous recipe for intraradicular rehabilitation of a fractured endodontically treated tooth by virtue of its biomimetic property. This review article addresses the esthetic and functional restoration of a fractured, endodontically treated maxillary left lateral incisor , through the preparation and adhesive cementation of a Biological Post made from a freshly extracted, intact maxillary canine. The use of a biological post can be considered as a novel alternative technique for the rehabilitation of an extensively damaged tooth.

Key words: Extracted tooth, Biological post, Dentin post, Metal posts, Esthetic posts

Context:

“They sure are handy when u smile. So keep your teeth around a while” Preservation of natural tooth is the ultimate objective of dental treatment .Endodontic treatment saves the tooth but the tooth becomes brittle and prone to fracture.^[1]

In order to strengthen crown some anchorage within teeth is necessary which is gained by rigid structure known as post. Metallic posts have dominated in the past because of their superior physical properties.^[2] Nevertheless because of their metallic color: aesthetics in anterior all ceramic restorations are compromised, particularly when a high lip-line or a broad smile reveals the entire restoration.

Only beauty is a phenomenon that cannot be measured. Today's patients not only expect us to provide them with healthy teeth but also desire beautiful teeth. The general

trend is towards aesthetic dentistry. ^[1]Esthetic concerns have led to the use of esthetic posts that offer biocompatibility, aesthetics, reinforcement of the remaining root, prosthesis retention and no corrosion.^[2]

Despite having varied types of commercially available posts, none of them meet all the ideal biological and mechanical properties. Biological Post serves as a homologous recipe for rehabilitation of a fractured endodontically treated tooth by virtue of its biomimetic property.^[3]

C.H. Swarupa et al [4] reported of a 19-year-old male patient with a complaint of fractured endodontically treated left maxillary lateral incisor. Clinical and radiographic examination revealed satisfactory obturation of the root canal and crown fracture extending till the junction of the cervical to middle 1/3rd. [Figure 1] shows Preoperative intra oral view.

The patient and his parents were given a detailed information regarding the advantages and disadvantages of all the feasible treatment options. Having agreed for the biological post, the proposed treatment plan included intraradicular biological post, followed by Porcelain fused to metal crown fabrication. Prior to the execution of the proposed treatment, a consent form duly signed by the patient was taken.

Post Space Preparation and Impression

The post space was prepared using Peeso reamers besides preserving a 5 mm of apical Seal. A direct wax impression of the post space was made. [Figure 2]

Fabrication of Biological Post

A freshly extracted, intact maxillary canine tooth was chosen and subjected to autoclaving at 121⁰C for 15 minutes. [Figure 3] The donor was subjected to a thorough review of medical history and routine blood investigations before the initiation of the procedure. As the extraction of healthy anterior maxillary teeth is quite uncommon, one

can make use of Tooth Banks—nonprofit institutions that store and provide teeth for didactic, clinical, and scientific use. As a freshly extracted tooth was used, the biomechanical properties of the dentine would be well preserved. The tooth was then sectioned bucco-lingually along the long axis using a diamond disk. The direct wax impression of the prepared post space served as a guide for the shape, thickness and

length of the post. [Figure 4] Using the wax impression, further contouring of the sectioned tooth into a dentin post and core was done. [4]

P Faria et al [5] have reported a successful esthetic and functional recovery of extensively damaged maxillary central incisors through the preparation and adhesive

cementation of biological posts and crowns in a young patient. The technique used by them for the fabrication of dentin post was, retrieval of an acrylic resin pattern of the canals from a plaster model, which was then used as a reference for shaping the dentin post. Similarly P.S Mandroli [6], Ranires Romito et al., [7] also reported successful

management of grossly mutilated deciduous teeth in pediatric patients using biological posts and crowns.

Adaptation and Cementation of Post to Root Canals

The dentin post[Figure 5]was periodically verified in the prepared post space throughout the process of contouring. Following satisfactory adaptation of the biological post clinically and radiographically,the post was cemented in the rootcanal using Self- Adhesive Resin Cement following the manufacturer's instructions.

P.Faria et al., [5] have conditioned the posts and the inner portion of the canals with 37% phosphoric acid for 15 seconds. Next, the adhesive system (ADPER SINGLE BOND 2,3M ESPE) was applied and the post was polymerized. The self-cured resin cement (C & B Cement, Bisco) was applied to the inner portion of the canals with the help of a lentulo spiral and lightly applied to the surface of the posts, which were then

Inserted into the canals under constant digital pressure until the end of the cement polymerization.

Crown Preparation and Cementation Procedures

The core was further modified using Filtek™ Z250 Universal Dental Restorative.[Figure 6]Following tooth preparation to receive Porcelain fused to metal crown, gingival tissue retraction was done and a rubber base impression was made. The PFM crown was fabricated and cemented using Self-Adhesive Resin Cement[Figure 7] because it allows a single step luting process, thereby eliminating any procedural techniquesensitivity.^[9]Self adhesive resin cements include in a single product the ease of handling of conventional cements as well as the mechanical properties, dimensional stability and micro- mechanical retention of resin cements.^[10]

The availability of extracted natural teeth would allow the use of biologic restorations to preserve the integrity of patient's natural dentition. "Biological Post" presents several advantages when assessing the recovery of tooth function and esthetics.^[4]

Comparison of properties of different posts

The modulus of elasticity of glass fibre posts is ~ 40GPa whereas the modulus of elasticity of root dentin is ~13.5GPa. This difference might create stresses at different interfaces and the possibility of post separation and failure. Dentin has a complex microstructure and a modulus of elasticity 13-18GPa, varying in different locations and directions, which may provide a mechanism that inhibits crack propagation in dentin.^[8] Even the flexural strength of fiber[Figure 8]and metal posts[Figure 9]is found to be

4-7 times high respectively, than root dentin^[9]

The dentin post closely resembles dentin in all physical properties like modulus of elasticity, viscoelastic behavior, compressive strength, thermal expansion, etc. Furthermore the fracture toughness of dentin has been found to be better than most of the current restorative materials. A dentin post forms a micromechanical homogenous unit with the root dentin that results in uniform stress distribution. The similarity in elasticity of a dentin post to root dentin may allow post flexion to mimic tooth flexion so that the post acts as a shock absorber, transmitting only a fraction of the stresses placed upon the tooth to the dentinal walls.^[8]

The use of natural, extracted teeth (homogeneous bonding) for restorations does, however, present limitations, such as the difficulty of finding teeth with a similar color and shape as that of the destroyed element, or the patient may refuse to accept a tooth fragment obtained from another patient, which prevents the execution of the restoration.^[5]

Concerning the ethical aspect, it is necessary to clarify to the patient and/or his parents or guardian that the post is made from duly donated and properly sterilized extracted teeth, thus preventing biosecurity risks.^[11]

Summary

“Biological Restorations” take on special importance in restorative dentistry as they are one of the variants of biomimetic restorations. These biologic restorations being less expensive, makes this practice a feasible option within Dental Institutions that attend mostly to people of a lower economic strata. Owing to the limited number of cases reported in literature we cannot accurately predict the success rate of biological dentin posts, however, Ambica K et al., [8] and Kathuria A et al., [9] in their in vitro study reported that dentin posts demonstrated higher fracture resistance than Carbon Fiber posts and Glass Fiber posts. Hence, the novel biological post technique for the management of endodontically treated teeth appears as a promising alternative to various commercially available post systems in permanent as well as deciduous dentition.

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